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SPECTROSCOPIC OBSERVATIONS OF THE DISTANT COMPANION OF CAPELLA

In 1913 Furuhjelm[1] announced that a faint star 12′ distant from *Capella* has a proper motion of 0″.42 in P. A. 171°, which is nearly the same in amount and direction as that of *Capella* itself. The star is following and south of the bright star and is not one of the companions given in Burnham's *General Catalogue*. A trigonometric parallax of +0″.076 was found for it at the Allegheny Observatory, and later at the Yerkes Observatory a value of +0″.075 was determined. The agreement of the parallax with that of *Capella* made it fairly certain that the star had some physical relation to *Capella*.

The photographic magnitude given by Furuhjelm is 10.6. From a rough comparison with nearby BD stars we estimate its visual magnitude to be about 9.8.

Two photographs of the spectrum have been obtained under poor conditions of seeing with exposures of three and two and one half hours, respectively, using the Cassegrain spectrograph and 7-inch camera of the Hooker telescope. The plates are underexposed in the region of wave-length, shorter than Hγ but serve to give a good idea of the character of the spectrum and a fair determination of the spectroscopic parallax and radial velocity. The spectrum is classed as Ma with the usual dwarf characteristics. The absolute magnitude determined by the use of the line λ4454 is 9.2. The spectroscopic parallax would then be +0″.076 if we use the estimate of 9.8 as the value of the apparent visual magnitude.

The radial velocity of the star has been measured and found to be +30 ± km per sec. Altho the dispersion used is low, the radial velocity agrees well with that of *Capella* which is +30.2 km per sec as determined at the Lick Observatory.

Thus the chain of evidence connecting this distant faint star with the giant *Capella* is complete as far as can be judged from position and motion. Altho their distance cannot be less than 10,000 astronomical units, their motions in space agree within the errors of the measurements.

W. S. ADAMS.
A. H. JOY.

TEN STARS OF CLASS B HAVING THE Hα LINE BRIGHT

SECOND LIST

Hα has been observed as an emission line in the spectra of the stars in the following list, photographed with the 10-inch Cooke refractor and objective prism on the dates indicated. The general appearance of the spectra is illustrated by Figures 2, 4 and 5 of Plate X of these PUBLICATIONS for December, 1920.

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[1] *A. N.* 4715, 182.

The observations marked "100-inch" were made in the usual photographic region with a single-prism slit-spectrograph. The normal appearance of Hβ and Hγ on slit spectrograms of stars of this kind is that of a bright line (usually consisting of two components) symmetrically situated within a broad absorption line, but exceptions frequently occur. Several examples of peculiarities in the hydrogen lines are found among the stars in this list and are briefly described in the notes. More complete descriptions will appear in the *Contributions from the Mt. Wilson Observatory.* This list is a continuation of one previously published[1].

STAR	R.A. 1900	DEC. 1900	SPECT.	MAG.	DATE	OBSERVER
HD 29866...	$4^h37^m.3$	+40° 36′	B5	6.1	1920 Dec. 29	H
					" 30	H 100-inch
					1921 Jan. 5	H 100-inch
					Feb. 19	H
HD 33152...	5 3 .2	+36 53	B2	7.8	1920 Dec. 29	H
					" 30	H 100-inch
HD 33232...	5 3 .7	+40 53	B3	8.1	1920 Dec. 29	H
					1921 Jan. 4	H 100-inch
					" 5	H 100-inch
					Feb. 27	M 100-inch
HD 33604...	5 6 .3	+40 5	B3	7.3	1920 Dec. 29	H
					" 31	H 100-inch
HD 37657...	5 35 .1	+43 0	B3	7.0	1920 Dec. 29	H
					Jan. 4	H 100-inch
HD 37967...	5 37 .2	+23 10	B3	6.1	1921 Feb. 8	H
					" 25	M 100-inch
HD 45910...	6 25 .2	+ 5 57	B3	6.7	1920 Dec. 10	H
					" 26	M 100-inch
					" 28	M
					1921 Feb. 26	M 100-inch
HD 50138...	6 46 .7	− 6 51	B9	6.6	1920 Dec. 10	H
					" 26	M 100-inch
HD 55135...	7 6 .6	−10 16	B5	7.2	1921 Jan. 10	H
					" 30	H 100-inch
HD 55271...	7 7 .1	−21 38	B8	6.7	1921 Jan. 10	H
					" 28	M 100-inch

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[1] These PUBLICATIONS 32, 336, 1920.

NOTES:

HD 29866	The bright portions of $H\beta$ and $H\gamma$ are not clearly seen.
HD 33152	Remark in HD: "The line $H\beta$ is not seen as a dark line and is suspected to be bright. The other lines are hazy."
HD 33232	The lines $H\beta$, $H\gamma$ and $H\delta$ are very peculiar, consisting each of a strong, sharply bounded absorption line with the violet edge bright.
HD 45910	The hydrogen lines are of the P *Cygni* type.
HD 50138	The bright $H\beta$ line is double but unsymmetrical, the component to the red being much the stronger.
HD 55271	The brighter component of the wide double Burnham's G. C. 3887.

MILTON L. HUMASON.
PAUL W. MERRILL.

NOTE ON THE COMBINED EFFECT OF ELECTRIC AND MAGNETIC FIELDS ON THE HYDROGEN SPECTRUM.

The great majority of the lines in the spectra of sun-spots exhibit well-known characteristics of widening or of resolution into several polarized components, easily reproduced in the laboratory by the influence of a magnetic field. The peculiar behavior of certain lines, however, has led me to undertake two new series of experiments.

The first of these involves the use of a small electric furnace, mounted within the coils of a special magnet in such a way as to permit the Zeeman effect to be observed at any angle up to sixty degrees with the lines of force. Bright or reversed lines can be studied, the latter produced, as in King's recent investigations, by inserting a graphite plug in the resistance tube of the furnace. By this means it is hoped to repeat and extend to other elements the important observations by Zeeman on the peculiar inverse effect given by the sodium (D) lines.

The second series of experiments has been initiated for the primary purpose of determining whether an electric field, of sufficient intensity to be detected, exists in sun-spots. The hypothesis that the magnetic field is produced by an electric vortex suggests the presence of an electric field, but our attempts to discover it by searching for the stark effect have thus far given negative results. It struck me as barely possible that some of the peculiarities in the spot spectrum might be due to the combined effect of electric and magnetic fields on the lines in question. Even if this should not prove to be the case the experiment seemed worth trying, because of the physical interest of any new phenomena that might be detected in this way.